VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION
ST. CROIX, VIRGIN ISLANDS, U. S. A.

Under the supervision of the
UNITED STATES DEPARTMENT OF AGRICULTURE

REPORT OF THE VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION

1922

IMPERIAL BUREAU
17 MAY. 192
OF MYCOLOGY

Issued December 15, 1923

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923

VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION, ST. CROIX.

[Under the supervision of the States Relations Service, United States Department of Agriculture.]

A. C. TRUE, *Director.*
E. W. ALLEN, *Chief, Office of Experiment Stations.*
WALTER H. EVANS, *Chief, Division of Insular Stations, Office of Experiment Stations.*

STATION STAFF.

JOHN B. THOMPSON, *Agronomist in Charge.*
CHARLES E. WILSON, *Entomologist.*[1]

---

[1] Resigned Aug. 31, 1922.

VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION
ST. CROIX, VIRGIN ISLANDS, U. S. A.

Under the supervision of the

UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C. December 15, 1923

REPORT OF THE VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION, 1922.

CONTENTS.

	Page.
Report of the agronomist in charge	1
Introduction	1
Station improvements	2
Proposed work in St. Thomas	2
Agronomic investigations	2
Horticultural investigations	4
Animal husbandry	10
Weather observations	14
Report of the entomologist	15
Scale insects	15
Sugar-cane insects	16
Tobacco insects	16
Trap pans as a control for truck-crop insects	18

REPORT OF THE AGRONOMIST IN CHARGE.

By J. B. THOMPSON.

During the year 1922 the Virgin Islands experienced a pronounced agricultural and business depression due to a protracted period of abnormally light rainfall, a decline in the price paid for sugar, and labor difficulties on the sugar plantations. The drought had a serious effect on crop production throughout the islands, and the need of water for domestic animals and even for household purposes was keenly felt at times in some sections of St. Croix and St. Thomas.

In the division of agronomy, experimental work with field crops was restricted to a small scale. The area devoted to sugar cane was greatly reduced, the plantings consisting entirely of seedling varieties that had been developed at the station by the former director, Dr. Longfield Smith.[1] Some plantings of Guatemala grass and Napier or elephant grass were again made to help supply feed for the livestock of the station. Both grasses are drought-resistant and are greatly relished by stock.

In the horticultural division a study was made of tropical-fruit production, it being the purpose of the station to introduce and develop varieties having better qualities than those now growing on the islands and affording promise of success under island conditions. At present many of the fruits and vegetables are imported from the neighboring island of Tortola. Comparative vegetable gardening tests were made at different seasons to obtain data on the produc-

[1] Resigned Aug. 27, 1921.

tion of different crops and to encourage the planting and increased use of such as are found to be practicable of production in the home garden.

In the division of animal husbandry the work was purely preliminary in character, consisting of a study of the station herd relative to the selection of a foundation stock for future breeding work.

In the division of entomology a study was made of the various scale and truck-crop insect pests and methods were determined for their control.

STATION IMPROVEMENTS.

The house started in 1921 for the use of the station scientific personnel was completed during the year (Pl. I, fig. 1). It is approximately 50 by 68 feet and contains six rooms. In connection with this house a cistern of concrete construction having a capacity of 15,000 gallons was built to supply water for domestic purposes.

Three other buildings were provided with eaves troughs, the total area from which water is collected for use of the station being thus increased by about 3,000 square feet. There is great need for some kind of a water-power system, comprising pump, engine, and the necessary storage space for a water supply for the station herd and for domestic needs.

Among other improvements was the clearing of several acres of brush land which it is hoped will help to relieve the shortage in the green-feed supply during the coming year.

PROPOSED WORK IN ST. THOMAS.

The station plans to establish demonstration vegetable plats in St. Thomas during the next year to help create interest in this important work. A great proportion of the land of the island is owned in large tracts, the prices of which are prohibitive when it is intended solely for agricultural use. In many instances the man who tills the land is a tenant or "squatter," holding and cultivating the land under a verbal agreement. This method of obtaining possession is decidedly prejudicial to the development of any permanent farm industry. The tenant who realizes that he many be dispossessed at the end of any month is reluctant to plant crops requiring a long season of growth. Naturally enough, very little interest is shown in the planting of fruit trees, and even the banana is not grown in sufficient quantity to supply local demand. The soil and the climate both here and in St. John, seem to be eminently suited for the growing of pineapples on a commercial scale, but the profitable production of this fruit demands that control of the land be assured for a period of years subsequent to planting.

AGRONOMIC INVESTIGATIONS.

THE SUGAR INDUSTRY.

In August, 1921, the sugar planters of St. Croix announced a reduction in labor wage, being influenced by the low price paid for sugar and by weather conditions, which seemed to promise a light yield of sugar and financial loss. Local labor organizations, however, refused to sanction the new wage scale and a strike ensued, remaining in force

for about three months. October to December, inclusive, is the most favorable time for planting sugar cane, more especially during a year of light rainfall. Owing to the strike, planting was delayed until a time when extremely dry weather rendered conditions most unfavorable for sprouting the cuttings and for the early development of the root system of the young plant. As a result, the area in plant cane is relatively small, the average stand is poor, and there is every indication of a light yield of cane in 1923.

Cane-breeding experiments.—Late in December, 1921, seedling varieties S. C. 12/4, S. C. 12/37, S. C. 13/13, and the standard varieties Crystallina and Ribbon, were planted in half-acre plats for purposes of comparison. No report can be made concerning them, owing to the lack of rainfall, but it is hoped that the plats will produce cutting material for planting at a more propitious time. Seedling 13/13 again produced a larger number of sprouts than any other cane. Cane cuttings of S. C. 12/4 and S. C. 12/37 were sent to San Domingo and to Trinidad during the year, and upwards of 200,000 cuttings of S. C. 12/4 were shipped to Porto Rico by St. Croix planters. The excellent results obtained in Porto Rico from this cane have created an urgent demand for it and even larger quantities of cuttings could have been marketed had they been available. Cane 12/4 will likely be grown most extensively in sections where the rainfall is comparatively heavy and soil moisture requirements are not very great. The strikingly erect habit of the leaves and canes under favorable conditions of moisture is not conducive to maximum yields where periods of drought occur or where moisture is the limiting factor. Upright growth does not permit of good sun protection, but hastens the loss of moisture and encourages the encroachment of other grasses and weeds. Cane S. C. 12/4 is less leafy than are some other varieties and casts less of the "trash" which is valuable as a mulch.

Of the many seedling canes grown from seed which was planted in January, 1922, a little less than 100 were produced from 22 S. C. 12/4 arrows. Seed from 8 arrows of Crystallina failed to produce a seedling, while 8 thrifty seedlings were obtained from one arrow of Blue Ribbon. At the close of the year approximately 300 new seedlings were ready for transplanting to the nursery upon the advent of wet weather.

LEGUMINOUS CROPS.

Cowpeas.—Efforts to grow cowpeas on a small scale have been very successful (Pl. I, fig. 2). On December 3, 1921, the seeds of 22 varieties received from the Office of Forage Crop Investigations, United States Department of Agriculture, were drilled in rows 50 feet long and 3 feet apart, the plantings being made on an unbroken rectangular area of 3,300 square feet. The ground, although in good condition at the time of planting, was not manured and no measures were taken to insure inoculation. All the varieties were harvested between February 17 and 27, 1922, when the average yield was at the rate of 570 pounds per acre. The highest yield, 762 pounds, was made by Early Black, and the lowest, 327 pounds, by Brabham.

Soybeans.—Short row tests were also made with 22 varieties of soybeans, the seed of which had been received from the Office of Forage Crop Investigations, United States Department of Agriculture. The beans were planted December 3, 1921, on a plat immediately adjoin-

ing that devoted to cowpeas. Although the soils of the two plats was similar in character, many of the soybean varieties failed. Those showing possibilities were, in the order of merit, Biloxi, Otootan, Early Brown, and Virginia, which yielded at the rates of 545, 436, 299, and 272 pounds, respectively, of shelled beans per acre.

CORN-IMPROVEMENT WORK.

Experiments begun in 1919 in crossing an improved strain of West Indian with Black Mexican sweet corn were continued during the year, the object being to develop a variety combining reasonably good table qualities with resistance to the corn earworm (*Heliothis obsoleta*). A broad-grained white corn from Guam was also grown, but it proved more susceptible to injury by the corn earworm than did the West Indian crossed with the Black Mexican type. Planted early in October, 1921, and harvested in February, 1922, the Guam white corn and the West Indian crossed with the Black Mexican type yielded 7.7 and 17.1 bushels, respectively, per acre.

COTTON.

The station joined with the cotton growers of St. Croix in the campaign for the control of the pink bollworm. Recognizing that the presence of this pest is a serious menace to the cotton industry, all cotton growers agreed to destroy all cotton plants and to discontinue the cultivation of the crop for a time in the hope that it might be possible to produce cotton again with comparative freedom from the pest.

HORTICULTURAL INVESTIGATIONS.

SWEET POTATO WORK.

Late in October, 1921, the sweet potato varieties Black Rock, Bigwig, and Key West Yam were planted in plats having an area of 1,775, 881, and 1,209 square feet, respectively, for the purpose of propagating vine cuttings. In February, however, many of the plants in each plat produced seed balls. The seed was collected and used for the production of new varieties. Black Rock and Key West Yam were harvested March 15, 1922, at a calculated yield of 5,096 and 5,040 pounds, respectively, per acre. Bigwig was dug March 24, yielding approximately 5,878 pounds per acre. (Pl. II, fig. 1.)

Two hills of Bigwig were probably descendants of a single bud mutation from the common draw bed, since they bore white roots in contradistinction to the dark red ones of the original. Young plants grown from these white roots appeared similar to those of the common Bigwig so far as the sharply cut and lobed-leaf pattern, and dwarf, almost vineless habit of growth are concerned, but they had less of the red coloring in the stems, petioles, and leaf veins than the older form.

Seedlings.—In order to ascertain the effect of high and low production of plants on the yielding habits of their progeny, some data were collected showing the number and weight of roots from individual seed-producing plants. The first mature seeds were har-

vested February 11, and each seed ball was sealed in an envelope and given a number corresponding with that borne by the parent plant. When the crop was harvested the roots from each labeled plant were counted and weighed.

The seed was planted in frames which were so divided that the seeds of the various numbers could be kept separate and the identity of the resulting plants could be readily established. In many cases the records available assisted in indicating the relationship existing between different seedlings. As illustrative of this fact, 21 seedlings numbering from 146 to 163 and from 263 to 265, inclusive, are all the progeny of one plant, BW–29, of the Bigwig variety. This plant bore four roots weighing 12 ounces, while the average production of the Bigwig variety averaged 3.8 roots, weighing 7.04 ounces. It is interesting to note the wide range of variation in leaf design, color, and development of vine in the plants within the same family.

At the close of the fiscal year there were growing in nursery hills a total of 95 Black Rock varieties, 68 of which were of known parentage, 161 Bigwig varieties, 109 of which were of known parentage, and 9 Key West Yam varieties, 7 of which were of known parentage (Pl. II, fig. 2). Unscarified seed was found to germinate very irregularly, the first plants coming up three days after planting, and others continuing to come up for at least 75 days. Most of the seed used in this work was sown in seed boxes the second week in March and continued to show germination until May 23, 1922. It being decided best to discontinue the further development of seedlings owing to the great amount of labor involved in testing them in the field, the soil was discarded and the seed boxes were stored for future use. A few weeks later, however, 18 additional seedlings were obtained from the discarded soil and potted. In this work a total of 283 seedlings, each of which is potentially a new and distinct variety, have been grown.

EXPERIMENTS WITH TRUCK CROPS.

Gardening in the Virgin Islands is seriously handicapped by recurrent periods of deficient rainfall and by insect pests which are often present in great numbers. It is thought, however, that by the adoption of certain methods both these difficulties may be at least partly overcome.

Preliminary experiments with vegetable growing from December to March, inclusive, were encouraging, the rainfall during this period approximating 23 per cent above normal, and the plantings escaping insect attack. During October and November, caterpillars appeared in numbers and damaged cabbage, kohl-rabi, turnips, mustard, and beets. Many of the vegetables planted late in September were destroyed by their ravages.

Approximately 2 acres of land of average productivity and ranging from a heavy, somewhat waxy, retentive soil on the south to a comparatively light, friable type on the north, was selected for the experimental work. The land, after being plowed and cleared of all trash, was laid off in four sections running north and south and measuring 50 feet in width. It was given no application of manure or other fertilizer, and was not artificially watered for the production of the vegetables grown.

Beans.—Of 43 varieties of table beans of all kinds, which were sown at the station during the year, 1 planted in September, was a failure, due probably to poor seed, and 25 were grown with varying degrees of success. Results from the other 17 varieties, planted between May and June, are not available at this writing. The particularly outstanding feature of the work was the marked superiority of the pole beans over the bush type in drought-resistance (Pl. III, fig. 1).

The yields from all varieties planted in September were greatly reduced by the dry weather. Practically all bush varieties planted at that time were failures, while the pole bean varieties produced fair yields. The following table shows the difference in yield of both bush and pole beans:

Yields of pole and bush bean varieties planted at different dates.

Pole bean varieties.	Date of planting.	Calculated yield per acre.	Bush bean varieties.	Date of planting.	Calculated yield per acre.
	1921.	*Pounds.*		1921.	*Pounds.*
Georgian Pole	Sept. 23	2,789	Black Valentine	Sept. 22	824
Kentucky Wonder	Sept. 24	5,495	Rust Proof Golden Wax	...do....	94
McCaslan Pole	...do....	3,748	Longfellow Bush	...do....	1,444
Kentucky Wonder	Dec. 3	11,049	Early Red Valentine	...do....	803
Kentucky Wonder Wax	...do....	9,220	Valentine Wax Bush	Sept. 23	304
McCaslan Pole	...do....	10,445	Refugee Wax Bush	...do....	81
Kentucky Wonder [1]	Dec. 10	3,980	Burpee's White Wax	...do....	136
			Stringless Green Pod	...do....	136
			Black Valentine	Dec. 9	3,430
			Improved Round Pod Refugee	...do....	4,046
			Wardwell's Kidney Wax	...do....	4,224
			Hastings' Excelsior	Dec. 10	2,922
			Extra Early Red Valentine	...do....	2,874
Average	.....	6,675	Average	.....	1,640

[1] This plat, planted December 10, 1922, yielded in addition to 137½ pounds of snap beans, 3½ pounds of dry shelled beans, which was at the rate of 3,980 pounds of the former and 101 pounds of the latter per acre.

The varieties White Navy or Boston Pea, Hastings' White Cornfield, and White Mexican Prolific Tree were grown as field or shelled beans. Planted December 9, 1921, and harvested February 28, 1922, White Mexican Prolific Tree produced at the rate of 805 pounds per acre of an excellent quality of well-dried shell beans (Pl. III, fig. 2).

Of the six varieties of Lima beans grown, Florida Butter Bean (pole) made the highest yield, producing at the rate of 7,700 pounds per acre. This variety is very drought-resistant. The following table gives the yields of the six varieties.

Yields of six varieties of Lima beans.

Variety.	Date of planting.	Calculated yield per acre.[1]
	1921.	*Pounds.*
Burpee's Improved Lima (bush)	Sept. 23	761
Improved Henderson's Bush Lima	do	3,209
Florida Butter Bean (pole)	do	7,700
Henderson's Early Leviathan (pole)	do	3,508
Burpee's New Giant Podded Pole Lima	do	3,322
Improved Henderson's Bush Lima	Dec. 10	3,080
Jackson Wonder (bush)	do	4,682
Average		3,751

[1] These figures represent beans in the pod which were picked when half were green and well filled and half were dry.

Of all the varieties of beans grown at the station Stringless Bonavist (*Dolichlos lablab*) was undoubtedly the least affected by the dry weather. A few seeds of this tropical variety were received from the Office of Forage Crop Investigations, United States Department of Agriculture, as S. P. I. No. 52363. The bean is edible but has a rather strong flavor. On December 3, 1921, a handful of the beans was planted in two rows, each 50 feet long, in a plat of 300 square feet. Fully 7½ pounds of green pods were picked in February and 10¼ pounds of dry shelled beans in May. The crop yielded approximately 1,089 pounds of green beans in the pod and 1,488 pounds of dry shelled beans per acre, and the vines were green and still bearing at the close of the year.

Beets.—Eight varieties of garden beets, planted in late September, were destroyed by caterpillars. Two other varieties, Eclipse Blood Turnip and Lenz Extra Early Turnip, planted in December, were a partial success. The former variety was seeded on an area of 2,000 square feet and yielded at the rate of 7,834 pounds per acre. The latter variety occupied 1,000 square feet of land and yielded at the rate of 7,252 pounds per acre. Beets are attacked by a webworm and other lepidopterous larvæ which render the crop uncertain.

Cabbage.—Small plants of 5 different varieties of cabbage were set in the garden during the first week of October, but were soon destroyed by caterpillars. Another planting in which relatively large plants of Henderson's Charleston Wakefield were used, was made September 27 and survived the caterpillar attack. Rather small heads were produced, however, but they were of good flavor and solid, weighing from 1 to 2½ pounds.

Carrots.—Carrots were successfully grown and proved of easy culture. Danver's Half Long, Long Orange Improved, Chantenay or Model, and Oxheart or Guerande, seeded September 28, were attacked by caterpillars in October. Small seedlings which were eaten below the crown died, leaving about 40 per cent of a normal stand which developed with remarkable vigor and produced large carrots of excellent quality. Some of those of the Chantenay variety weighed 1½ and 2 pounds and were very tender and free from fiber. The yields in the order of merit were Danver's Half Long, Long Orange Improved, Chantenay, and Oxheart, 10,602, 9,392, 6,929, and 6,638 pounds, respectively, per acre. In December a second plant-

ing of Oxheart carrots was made on an area of 1,400 square feet. The crop developed in the dry season and yielded at the close of the fiscal year 200¼ pounds. Seed of the same variety was again drilled in a small plat in February and the crop attained considerable size notwithstanding the dry weather. It is probable that some of the varieties of the long rooted type would be preferable to Oxheart for planting as a dry-season crop.

Eggplants.—New York Improved Spineless and Burpee's Black Beauty, transplanted to the garden in October, made satisfactory growth and in January bore a promising crop in various stages of development. Some of the fruits were excellent, being of uniform symmetry and weighing more than 3 pounds. The crop was stricken with a blight in February, however, and died early in March.

Kohl-rabi.—White Vienna and Early Purple Vienna were successfully grown when set in the field in September, the stem or edible portion attaining a diameter of 2 to 3½ inches and weighing more than a pound. Kohl-rabi will succeed in the Virgin Islands under conditions of light rainfall. It should not be allowed to reach full development as in this stage it becomes woody.

Okra.—Although okra is commonly grown on the island, the demand for it is seldom fully supplied on the market. At the station the vigor of the plants was increased and the bearing season prolonged by careful and frequent tillage and by picking the crop four times a week, thus allowing no pods to mature. The following table gives the yields of three varieties which are grown at the station.

Yields of three varieties of okra.

Variety.	Date planted.	Number of pickings.	Calculated yield per acre.
	1921.		*Pounds.*
Perkins' Long Podded	Oct. 6	56	6,678
Perkins' Mammoth Long Podded	...do	56	6,577
Perkins' Long Podded	...do	56	4,805
White Velvet	Dec. 8	40	5,725
Do	...do	40	5,050
Average			5,767

Onions.—The island of Tortola, which is separated from the island of St. John only by a narrow channel and which shows no marked advantage over the latter in the productivity of its soil, has for a number of years produced onions for home use and for export. The Virgin Islands, on the other hand, grow practically no onions, but depend entirely upon importation for their supply of this vegetable. Preliminary experiments conducted during the year to determine the possibility of growing Bermuda onions in St. Croix, were very successful. The seed of the varieties White Bermuda and Red Bermuda was obtained from a New York firm and sown in boxes in September. The young plants were transplanted to trial plats in December, the rows being made 24 inches apart to permit of wheel-hoe cultivation. The crop was harvested in May, Red Bermuda and White Bermuda then producing at the rate of 13,409 and 10,638 pounds, respectively, per acre. The

onions were of good size, some of them measuring 4 inches in diameter. (Pl. IV, fig. 1.)

In June, 1922, a crate of these onions was dispatched to Washington, D. C., via New York, to test their shipping qualities. They arrived in very satisfactory condition, only 27 having decayed or sprouted en route.

Peppers.—Tests were made with the varieties Fancy Wrinkled Mixed, Ruby King, Neapolitan, and Pimiento. Fancy Wrinkled, as its name implies, is variable in color and form, being yellow, orange, or crimson, and small. It is extremely pungent and is used by the native population as a relish for meats and for flavoring soups. Pimiento, like Ruby King and Neapolitan, is a sweet variety, and is so mild in flavor as to be eaten without inconvenience even when it is highly colored. The seed of all these varieties was sown in seed boxes in September and the seedlings were transplanted to the garden in October. The first fruits were picked in December, and the plants continued bearing until May.

Radishes.—Four varieties of radish, drilled in the garden in September, were destroyed by caterpillars in October. Two other varieties, Long White Icicle and White Strasburg (Pl. IV, fig. 2) planted in December, produced 242 and 209 dozen radishes of fine size and quality, respectively, per plat of 800 and 1,000 square feet each. A second planting of four varieties was made in May, but a very dry period immediately followed and the seed failed to germinate promptly. Light showers falling later, a very satisfactory stand was had after the seed had remained in the ground about 40 days.

Tomatoes.—The tomato as commonly grown in the Virgin Islands is very small and of inferior quality. Nine varieties were grown at the station for purposes of comparison, some of which produced fruits weighing 1½ pounds. The soil in which the varieties were grown was given ordinary field, rather than garden, preparation, and the seeds were sown in boxes early in September. One hundred plants of each variety, except Tenderloin of which only 76 plants were available, were transplanted to the field early in October. Chalk's Early Jewel, a smooth tomato of uniformly good size and pleasing appearance, was the most productive and probably the most satisfactory of the varieties tested. Long Keeper was a heavy yielding variety, but the fruits were undersized. Golden Ponderosa was large in size but light in yield, and the fruits were soft, having tender skin that did not well stand handling. The following table gives the yields of each variety:

Yields of good, sound, marketable fruits by varieties of tomatoes grown at the station.

Variety.	Number of fruits.	Weight of fruits.	Variety.	Number of fruits.	Weight of fruits.
		Pounds.			*Pounds.*
Chalk's Early Jewel	2,158	556	Stone	1,127	261
Long Keeper	3,264	527	Ponderosa	532	242
Matchless	1,069	250	Tucker's Favorite	570	123
Burpee's Dwarf Giant	589	190			
Tenderloin	218	88	Average	1,095	267
Golden Ponderosa	335	166			

AVOCADOS.

The climate and soil of the Virgin Islands seem to be admirably suited to the growing of the avocado. Occasional periods of drought and the less frequently occurring hurricanes render the cultivation of this fruit difficult, however. To offset damages from these sources, growers frequently plant the trees where the water supply is relatively stable and the natural growth of the trees can serve as a windbreak. There are considerable areas of trees and shrubs on hill lands where the soil is of a rather loose, friable character. During the year soil of this sort was tested to determine its adaptability to avocado growing, a well sheltered section being selected for the purpose. Circular areas 6 to 8 feet in diameter were cleared and thoroughly spaded for the placing of 41 seedlings and about 200 pounds of barnyard manure was incorporated with the soil in each area. The seedling avocados were planted in April and the adjacent surface was thoroughly mulched with old hay and litter in the hope of conserving moisture for use during dry periods. The plants were watered at the time of setting and again later in April and in May. Each seedling was numbered and its measurement recorded.

ANIMAL HUSBANDRY.

CATTLE.

In the Virgin Islands cattle raising is second in importance only to the production of sugar. In each of the three main islands there are large areas of rough, rolling land that, not lending itself readily to implemental tillage, is well suited to the production of Guinea grass which makes a nutritious feed for stock. Since cattle make small demand upon labor, they should be raised not only to supply the family with food in the form of beef, milk, cheese, and cream, but also to consume the waste products of the farm and to help conserve the fertility of the soil.

With the beginning of the fiscal year 1922, the station had on hand work animals, milk cows, young stock and calves aggregating 26 head, which was increased by birth during the year to 35 head. The individuals are of the types commonly found in the islands, and are thought to be as nearly representative of this class as can be found (see figs. 1, 2, 3, and 4). In a study made to determine the best animals with which to start a foundation stock, breeding, calving, and weight records of all aninals were taken, including the birth weight of calves. Accurate records of milk production were kept and histories and photographs of the various animals were obtained as far as possible. The blood relation existing between the various animals of the herd was determined and these data were prepared in record form somewhat suggestive of the ordinary pedigree sheet. An illustration of the family record is given:

The offspring of cow "Queen," belonging to the station.

Queen {
- Cow, Bella, born 1918.
- Bull, January, born January, 1922.
- Heifer, Malvina, born 1919.
- Bull, Harrold, born 1920.
- Heifer, Rose, born January, 1922.

FIG. 1.—NEW RESIDENCE, VIRGIN ISLANDS STATION.

FIG. 2.—COWPEA TEST PLATS.

FIG. 1.—BIGWIG SWEET POTATOES. VARIETY BLACK ROCK IN BACKGROUND.

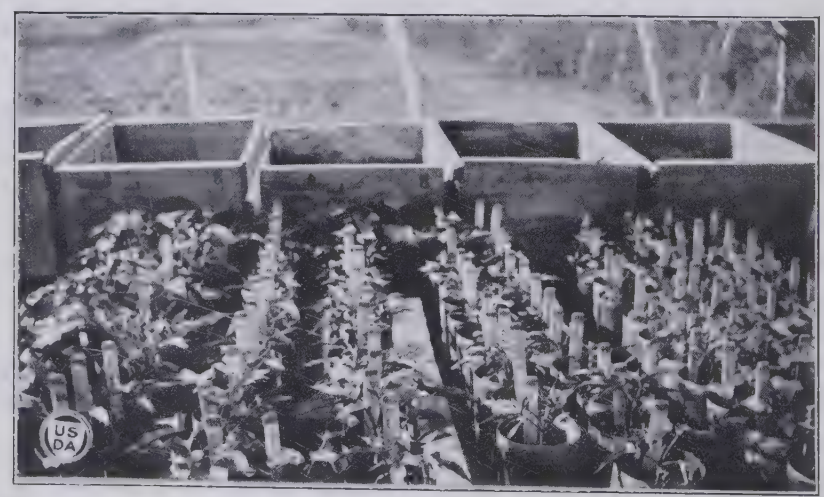

FIG. 2.—PROPAGATING BENCH SHOWING SOME OF THE SEEDLING SWEET POTATOES.

FIG. 1.—KENTUCKY WONDER BEANS, 63 DAYS AFTER PLANTING.

FIG. 2.—PLAT OF WHITE MEXICAN TREE BEANS.

FIG. 1. WHITE BERMUDA ONIONS AT VIRGIN ISLANDS STATION.

FIG. 2.—WHITE STRASBURG RADISHES, 28 DAYS AFTER PLANTING.

FIG. 1.—Station bull, Bowman; weight, 1,500 pounds.

FIG. 2.—Station bull, Fleming; weight, 1,300 pounds.

FIG. 3.—Station steer, Jacob; weight, 1,180 pounds.

FIG. 4.—Station cow, Helen; weight, 775 pounds.

Weight of station cattle.—The cattle of the Virgin Islands doubtless may be regarded as of good size and conformation when it is considered that the strain has been developed and bred for generations within the Tropics. They are of mixed type, having descended from importations of various European breeds which were occasionally merged with Zebu blood. The practice, followed for generations, of employing cattle as draft animals in the cane fields has encouraged the development of animals of large size and great strength. Those of the present day are incomparably superior in both size and conformation to the "native" or "piney-woods" animals of the Gulf regions. The following table gives the weight of all the mature work animals and mature cows at the station:

Weights of mature cows and work animals of the St. Croix station.

Cows.	Weight.	Work animals.	Class.	Weight.
	Pounds.			*Pounds.*
Agnes	850	Bowman	Bull	1,500
Helen	775	Fleming	do	1,300
Georgia	875	Nelthropp	Steer	1,375
Queen	1,060	Cocoa	do	1,310
Beauty	885	Bishop	do	1,340
Mongoose	920	Jacob	do	1,180
Judy	820	Elliott	do	1,215
Maud	775	Beckman	do	1,130
Bella	1,000			
Average	884	Average		1,294

The work animals belonging to the station are undoubtedly heavier than is the average mature male, but they probably are not larger than the average of all the work stock found on the island. Neither work animals nor cows were fat when the weights were taken, and some were in thin flesh.

Birth weights, obtained for the last six calves which were dropped during the year ranged from 47 to 74 pounds, with an average of 58 pounds. Three calves which were removed from their mothers at birth and brought up by hand were each given a small quantity of milk at first, the portion being gradually increased until at two weeks of age the animals were receiving 5 pounds twice daily. At 6 weeks of age the animals were given skim milk in place of whole milk and placed on good pasture. The following table compares the weights of these calves at four months with the weights made by the animals which were allowed to follow the cow:

Comparison of weight of seven 4-months-old calves.

Animals which were fed by hand.	Weight.	Animals which were allowed to follow the cow.	Weight.
	Pounds.		*Pounds.*
November	202	Starlight	126
Cherry	190	Hunter	120
Mary[1]	114	Rose	118
		January	160
Average	168	Average	131

[1] Mary was the offspring of an aged cow and weighed only 47 pounds at birth. She was removed at birth from the mother, but returned after three days, as the cow persisted in holding her milk and udder troubles were threatening. The calf was then placed with the cow for 10 days and again removed and fed by hand. It is thought that these variant methods of feeding during the first two weeks of its life had to do with its indifferent growth.

Milking practices.—Herd management in the Virgin Islands differs altogether from that commonly practiced in well-developed dairy sections of the States. Here the calf is seldom hand fed, but is allowed to follow the mother during the morning, taking such milk as is formed during that period. It is removed from the mother at noon and kept separate until the following morning. The cow is milked only in the morning, and, as she holds the milk for her calf, the latter is permitted to take the milk at intervals during milking to encourage the flow. Such practice usually renders a cow unfit for milking independent of the calf. Withholding the milk seems to have become an almost inherent trait in the native cow. An attempt to milk two heifers without the calves resulted in failure, one cow going dry in two weeks and the other forcing the return of the calf. Had these heifers been properly and regularly handled before calving it is likely that they could have been milked without the calves. Frequently the calf, when separated from the mother, is confined where the grazing is poor or even in a dry lot. The duration of the lactation period being dependent upon the calf, the latter is not infrequently placed where there is little feed when it shows an indifference toward the cow, so that hunger will force it to return to the mother. As a result, the average calf presents a scrubby appearance during the early months of its life. It must be admitted, however, that once weaned and placed on good pasture, the calf quickly returns to normal condition.

At the station it has been the policy to let the calf follow the cow during the day, keeping it confined only at night. A cow managed in such a way can hardly be expected to make good returns at milking time, yet some of the best animals have shown evidences of fairly good milking qualities. One cow, Beauty No. 13, when handled in this way and milked once a day, yielded 214.5 pounds of milk during the eleventh month after calving. She had not been, during any part of her lactation period, fed anything other than pasturage, and during a part of the time grazing was short. She dropped another calf in May, 1922, and during June, when similarly treated, she fed the calf and gave 360 pounds of milk, although grazing was short.

WEATHER OBSERVATIONS.

The weather in the Virgin Islands during the 1921–22 period was again abnormally dry, the actual precipitation amounting to only 33.57 inches. The following table compares the average rainfall for the period 1852–1911, inclusive, with the precipitation of 1921–22:

A comparison of the monthly rainfall for 1921–22 with the normal.

Month.	Precipitation in 1921–22.	Average precipitation from 1852 to 1911, inclusive.[1]
1921.	*Inches.*	*Inches.*
July	5.39	3.65
August	1.24	4.70
September	4.49	6.07
October	4.67	6.56
November	1.72	5.23
December	3.36	3.53
1922.		
January	2.99	2.38
February	3.12	1.91
March	2.32	1.70
April	.68	2.60
May	.74	4.47
June	2.85	4.01
Total	33.57	46.81

[1] These figures were taken from Virgin Islands Sta. Bul. 2, p. 7.

REPORT OF THE ENTOMOLOGIST.

By C. E. Wilson.[2]

Studies of insects attacking the economic plants of the Virgin Islands were continued during the year, and two manuscripts, dealing with insects commonly found attacking cotton and with those attacking truck crops, were submitted for publication.[3]

Specimens of scale insects were submitted for determination and verification to Harold Morrison, of the Bureau of Entomology, United States Department of Agriculture.

SCALE INSECTS.

Due to drought, scale insects were more numerous this year than ever. Only two species of scale insects, *Hemichionaspis minor strachani* and *Pseudaonidia tesserata*, can be added to the list compiled by the entomologist in 1920–21.[4] The former species did considerable damage to the keneppy-tree (*Melicocca bijuga*), and the latter species, taken with the former, was reported as severely injuring grapevines in 1920.

The joints of Para grass were severely infested with a species of Odonaspis.

[2] Resigned August 31, 1922.

[3] Virgin Islands Sta. Buls. 3, Insect pests of cotton in St. Croix and means for combating them, and 4, Truck crop insect pests in the Virgin Islands and methods of combating them, copies of which may be had by addressing the station.

[4] Virgin Islands Sta. Rpt. 1921, p. 13–19.

SUGAR-CANE INSECTS.

Due mostly to the uncultivated and weedy condition of the cane fields, resulting largely from the laborers' strike, sugar-cane insects were more numerous this year than during the two previous years.

The grubs of the rhinoceros beetle (*Strategus titanus*) and the West Indian sugar-cane borer (*Diaprepes abbreviatus*) were present in great numbers in cane stools, the different varieties averaging 1 larva of the former species and 13 of the latter per stool in July, 1921.

Poisoned bagasse gave great satisfaction as a control measure when composed of 100 parts of bagasse and 3 to 5 parts of Paris green. Handfuls of the bagasse were placed in holes every few feet in the cane rows, and the holes filled with dirt.

Larvæ of the fall army worm (*Laphygma frugiperda*) did considerable damage to the cane plants by eating the tender leaves.

The sugar-cane borers *Lagochirus araneiformis* and *Metamasius sericeus* ravaged the crop to the extent of 10 per cent.

TOBACCO INSECTS.

Although tobacco is not now a commercial product in these islands, it may be well to give a brief account of the insects attacking the crop in case it is grown on a commercial scale in the future.

Tobacco-worm Moth (*Protoparce sexta*) and Tomato Worm (*P. rustica*).

The first species, in the larval stage, punctures small holes in the leaves of the plants. It develops in about three weeks and becomes a voracious feeder, eating as many as three leaves in a day. The mature larva is about 4 inches long and of green color banded on the sides with white. On completing development the worm becomes restless and active, crawling around for an hour or so before tunneling into the soil.

In the adult stage the tobacco worm feeds on the nectar of flowers. The wing expanse is about 4 inches and the wings are of brownish-gray color, the hind wings being somewhat lighter than the fore wings. The abdomen is strikingly marked on each side with five yellow spots and the head is prominent and the eyes are large. The moth flies late in the evening and at night.

At the station the longest period of development for this species, from the egg to the adult stage, was 58 days and the shortest 46 days.

The tomato worm (*P. rustica*), also known as the hornworm and tobacco worm, is readily distinguished from *P. sexta* by its color markings. *P. rustica* has five conspicuous pink spots on each side of the abdomen, while *P. sexta* has yellow abdominal spots and no markings near the base of the hindwing. In habit and life history the two species are similar.

Tobacco Flea-beetle (*Epitrix parvula*).

The tobacco flea-beetle was commonly found on suckers and ratoons during March and April. In the larval stage the beetle is small, threadlike, and of yellowish-white color. After feeding for about 18 days on the roots of the host plant, it transforms into the pupal stage.

The adult beetle is of dull reddish-yellow color. The abdomen is brown and the legs and antennæ are pale reddish-yellow, with the exception of the hind femora and the four distal joints of the antennæ, which usually are darker.

Cotton[5] found that equal parts of arsenate of lead and hydrated or air-slaked lime or dry leached wood ashes were effective in controlling the tobacco flea beetle.

Tobacco Suck-fly (*Dicyphus* sp.).

The nymphs and adults of the tobacco suck-fly are long legged and of pale green color. They feed by sucking the juice from the leaves of the plant, but rarely occur in sufficient numbers to be of economic importance.

Tobacco Budworm (*Heliothis virescens*) and Corn Earworm (*H. obsoleta*).

The larvæ of the tobacco budworm are present in great numbers in tobacco seed pods from December to April. They vary greatly in color, ranging from pale yellowish-green to gray-green, light and dark brown, grayish-black, and almost black. The mature larva is about $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long.

The adult moth has a wing expanse of 1 to $1\frac{3}{8}$ inches. The forewings are greenish in tinge crossed transversely by three yellowish-white stripes which are bordered on the outer margin with dark green or reddish-brown lines. The hindwings are white bordered with gray, blackish-gray, or reddish-brown.

The larvæ of the corn earworm (*H. obsoleta*), also known as the cotton bollworm, tomato fruit-worm, and false budworm, are commonly found boring into tobacco seed pods from February to March. Like the preceding species, they vary greatly in color.

Snowy Tree Cricket (*Œcanthus niveus*).

Young tree crickets are commonly found on tobacco plants. They eat the leaves to a certain extent, but are considered beneficial rather than harmful, since both larvæ and adults feed on plant lice.

West Indian Sugar-cane Root Borer (*Diaprepes abbreviatus*).

The adults of *D. abbreviatus* are commonly found feeding on tobacco leaves, but may be controlled by hand picking. The larvæ is white or slightly yellowish-brown and has a brown head. The adult is grayish-green.

Tobacco Beetle (*Lasioderma serricorne*).

The tobacco beetle, which has been distributed through commerce to all parts of the world, feeds on leaf tobacco and all forms of manufactured tobacco. The larva has a yellowish-white curved body which is covered with hair, and when fully grown is about 4 millimeters long. The head is light brown and the legs are short and light brown. The larvæ require 30 to 45 days for development. The adult is

[5] Jour. Dept. Agr. Porto Rico, Vol. II, p. 272.

2 to 3 millimeters long and of dull reddish-yellow or brownish-red color with broad head and small eyes. The adults are active and avoid intense light.

The tobacco beetle may be controlled by fumigation by means of carbon bisulphid. Four pounds of this poison should be used for each 1,000 cubic feet, care being taken to have no fire around, as the fumes are highly inflammable and explosive. The tobacco should be exposed to the carbon bisulphid fumes from 24 to 48 hours.

TRAP PANS AS A CONTROL FOR TRUCK CROP INSECTS.

Various methods have been employed for trapping insects attacking truck crops, including trap crops, light, and attractive baits. At the station the trap pans used were 8½ by 17 inches, and the materials consisted of common factory black molasses, which sells for 2 cents a gallon in St. Croix, and water having a kerosene film. The insects were collected at the end of each 24-hour period from pans set in plats growing radish, mustard, Chinese cabbage, turnip, beets, and carrots. A total of 20,116 insects were caught in 251 days in 41 pans. An examination of 105 trapped female moths, representing 11 species, showed that approximately 63 per cent had oviposited before capture.

To determine whether molasses attracted the insects or whether they were accidentally trapped, two series each of three pans, of molasses and water having a kerosene film, were set in a mustard plat for five days. At the end of that time the molasses pans were found to contain 2,232 insects while the kerosene trap pans had 3,902. It is concluded, therefore, that molasses does not attract small moths and that truck crop insects are not to be controlled by means of trap pans.

It was observed, in relation to the effect of weather on trap-pan control, that with a high wind, no rain, and a temperature of 70° F., or higher, the catch of moths was large, and that with light wind, rain, and a temperature below 68° F., the catch was small.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
5 CENTS PER COPY

PURCHASER AGREES NOT TO RESELL OR DISTRIBUTE THIS COPY FOR PROFIT.—PUB. RES. 57, APPROVED MAY 11, 1922

▽